PROGRESS REPORTS

FROM

EXPERIMENT STATIONS

SEASON 1954-55

TANGANYIKA TERRITORY
EASTERN PROVINCE

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For the 1954-55 season and subsequently the Progress Reports published in this series will be confined to those from territories in which members of the Corporation's staff are working. For 1954-55 the list will be:—

Cotton Research Station, Namulonge,
Sudan,
Kenya,
Tanganyika—Lake Province,
Tanganyika—Eastern Province,
Nyasaland,
Northern Nigeria,
Aden,
West Indies,
Survey of Reports.

TANGANYIKA TERRITORY
EASTERN PROVINCE

PROGRESS REPORT FOR THE SEASON 1955

BY

R. SMITH.

Cotton Season.

Planting: February to April.

Picking: July to December.

Legal uprooting dates by districts:

Kilosa, Bagamoyo, Kisarawe and Morogoro (Duthumi)	15th November.
Morogoro (except Duthumi) and Ulanga ...	30th November.
Rufiji	31st December.

Meteorological data, 1955:

Month.	*Temp. (Monthly means) Min. Degrees F.*	*Max. Degrees F.*	*Rainfall Monthly total Inches.*	*Rel. Hum. 8 a.m. Monthly means Percentage.*
Jan.	71·9	93·8	4·52	80·8
Feb.	68·9	86·5	6·76	79·4
Mar.	66·3	90·6	5·35	72·4
Apr.	68·4	85·9	14·86	77·9
May	66·3	81·9	6·74	79·1
June	62·4	80·0	0·54	80·1
July	61·3	81·7	0·55	75·2
Aug.	59·1	85·2	0·25	70·0
Sept.	62·1	88·7	0·03	64·8
Oct.	64·6	89·5	0·17	65·8
Nov.	69·7	92·3	1·05	67·2
Dec.	70·8	92·1	6·72	70·8
			47·54	

Introduction.

The striking feature of this season, climatically a good cotton season, has been the large increase in yields obtained by the use of insecticides from all trials where reasonable cultivation has been practised. At Ilonga the mean yield of 15 acres of the plant breeder's cotton trials and bulks was 1,600 lb. seed cotton per acre, where insecticide was used and cotton was early planted. Equally well tended early planted cotton, not dusted, gave a mean yield of 175 lb. seed cotton per acre, for an area of three acres. The comparative cash return for a

commercial grower would have been £39/1/0 per acre, using insecticide, and £3/11/6 per acre where no insecticide was used. The total cost of insecticide amounts to about £3/10/0 per acre for 10% DDT, 3% BHC dust.

The comparison held good through the Province.

Average Yield District Plot Variety Trials (Dusted).

	Lb./acre seed cotton.
Mvomero	764
Mkundi	1244
Duthumi	755
Kissaki	754
Mione	693
Msoga	1356
Malinyi	1242
Mwaya	524

Generally, rainfall was good and well distributed throughout the Province, but pest attack was heavy. A considerable acreage was planted early (February and early March) but a high jassid population developed on these plants, causing serious damage—very much more than ever previously reported. This attack was probably associated with early planting of considerable areas and heavy rainfall, and a jassid resistant strain is urgently needed. Later, the crop was seriously damaged by American and spiny bollworm and many bolls were lost. The February plantings resulted in tall plants of rank growth, carrying little crop. Later planted cotton (April) missed the main jassid attack but was badly damaged by American and spiny bollworms. A small late crop was picked. In the area planted to 47/10 at Duthumi, the late crop was much bigger, and as a result 47/10 gave bigger yields per acre than Local. The ten district plots planted around the Province gave good yields, owing to insecticide application, good cultivation and ample rainfall. They proved useful in instructing surrounding growers how to grow cotton properly, and they advertised the advantages of using insecticide.

Levels of cultivation and interest in cotton vary from district to district and also within each district. Bagamoyo and Mahenge were generally below the level of the other districts, because roads there were bad and interest in the crop only recently awakened. The growers in Kilosa district tend to interplant cotton with other crops. The Duthumi area is probably the best cultivated, with the most interested growers. Within each area the growers divide themselves into three main groups; the progressive farmer interested in the crop and the money he will derive from it; the farmer who plants a large acreage and is interested only in the money, and the farmer who plants half an acre or interplants with food crops and is grateful for any return at all.

Cotton growing in the Eastern Province is difficult. The difficulties are:—

1. heavy jassid attack on early planted cotton:
2. American bollworm infestation:
3. bad communications in some areas and a shortage of informed advisers:
4. a low level of interest on the part of the grower.

The answers to these difficulties are shown by the yields obtained on Ilonga and district plots; they are timely planting with a jassid resistant strain, and the use of insecticide on a well tended crop. Ten African Instructors are being trained annually in cotton growing on Ilonga, and the European advisory staff is being increased.

In the more easily accessible areas, next season, selected growers in each district are to be provided with insecticide and given informed instruction and close supervision on its application by Department of Agriculture staff. The results from this may give an indication of the degree of interest and the possibility of widespread use of insecticide in native gardens.

The main hope lies in the few hard working, interested growers who are attracted and encouraged by the profit from using insecticide. If they continue to buy and use insecticides properly they may influence their less ambitious neighbours to take better care of their cotton and use insecticide.

The general cotton growing conditions at Ilonga in 1954-55 were good; the February planting rains were well distributed and continued long enough to establish the crop and enable it to withstand the twenty days of drought during March. The April and May rains were heavy, and the growing season was longer than the previous year. Little cotton was picked from the non-dusted plots but these continued flowering until the cotton was uprooted. The dusted cotton produced a good crop. Senescence occurred in late August.

Trials on Growing Conditions.

Spacing-Time of Planting.—All the relevant details are included in Table 1 and help to confirm the results obtained last year, despite the onset of the heavy jassid attack this season.

In the dusted treatments, February plantings gave roughly 1,000 lb. seed cotton per acre more than March plantings; April plantings gave negligible yields. One foot between plants, thinned to one plant per hole, gave the highest yield for all dates of planting.

TABLE 1.

SPACING—TIME OF PLANTING TRIALS.

2 trials, one dusted with 10% DDT and 3% BHC weekly in May and June, one not dusted. Each of 5 blocks with 10 treatments, 1/110 acre per plot, 3 ft. ridges tied, strain 47/10.

Treatments.			*Yields.* *Seed cotton lb./acre.*	
	Between plants.	*Plants per hole.*	*Dusted.*	*Not dusted.*
February	6″	1	1579	98
	12″	1	1782	50
	18″	1	1623	134
	24″	2	1498	69
	36″	2	1554	67
March	12″	1	695	—
	24″	2	573	—
	36″	2	425	—
April	12″	1	34	—
	36″	2	11	—
Sign. Diff. (P·05)			241	Not sign.
S.E.			76	—
% Grade I seed cotton			63%	50%

The trials which were not dusted gave very poor yields. Jassid bred up on the February plantings and killed large numbers of plants in the later sowing, seriously affecting the February plantings too. Where bolls were formed these were mainly damaged by American and spiny bollworms.

The result emphasises the need for jassid resistance and insecticide, and shows the increases obtained by planting in February.

Interplanting Trials.—These trials were planted partly as a demonstration for native growers and partly to obtain results to show the advantages or the disadvantages of interplanting and to see how efficiently cotton could be dusted when interplanted with food crops. In this case, Swaine dusters were used and gave as good protection as the Procall rotary dusters used on all the other trials and small bulk cotton plots.

The results are shown in Table 2. Cotton yields only are shown as the food crops planted between the cotton are used by the native cultivator and no cash return is obtained from them. Again the dusted plots gave very good yields and the contrast with non-dusted plots is remarkable.

TABLE 2.

INTERCROPPING TRIAL.

8 reps. (4 reps. dusted with 10% DDT and 3% BHC, May and June, 4 reps. not dusted). Plot size 1/20 acre, 3 ft. ridges tied, strain 47/10.

Treatments.	*Yields.*		*Yield in terms of pure stand cotton on single acre basis.*	
	Dusted.	*Not dusted.*	*Dusted.*	*Not dusted.*
Cotton	2500	106	2500	106
Cotton and maize (alternate rows)	615	15	1230	30
Cotton and sorghum (alternate rows)	882	15	1764	30
Cotton and beans (on sides of ridges)	451	13	451	13

Cash return in terms of pure stand cotton on a single acre basis.

	Dusted.	*Not dusted.*
Cotton	£61 5 0	£2 3 0
Cotton with maize	£30 1 0	£0 13 0
Cotton with sorghum	£43 0 0	£0 13 0
Cotton with beans	£11 1 0	£0 11 0

Cultivation Trial.—An attempt was made to imitate the standards of cultivation of native gardens, i.e. good, indifferent, bad. Cotton was planted early and late, on the flat, the ridge and the tie-ridge. Certain treatments were clean weeded and thinned early; other treatments were allowed to remain weedy and unthinned for a considerable period. Three replications were sprayed with 10% DDT and 3% BHC for 10 weeks during May and June by Colonial Agricultural Insecticide Research Unit (C.A.I.R.U.) staff.

TABLE 3.

CULTIVATION TRIAL.

6 blocks, 27 treatments, 3 blocks sprayed, 3 blocks not sprayed. Plot size 1/145·2 acres, strain 47/10.

Yields in lb./seed cotton per acre.

Time of planting	*Sprayed.*	*Not sprayed.*
February	974	58
March	340	10
April	20	1
Standard of cultivation.		
Good	611	44
Fair	429	8
Poor	295	17 (due to drifting spray)
Type of cultivation.		
Flat	538	21
Ridges	424	20
Tie-ridge	372	28

Owing to the large number of missing plots (i.e. no cotton picked from them) the results were not analysed.

The main points from the results (Table 3) are:—

1. Early planting and spraying gave the biggest increases irrespective of other factors.
2. The large differences in yield between the sprayed and non-sprayed plots. Jassid and bollworm crippled the non-sprayed plots.
3. The increase in yield obtained by good cultivation compared with poor cultivation.
4. Cotton planted on the flat gave the best yield, but the differences were not great and can be accounted for to a certain extent by the type of layout, the topography of the area (almost flat land) and the heavy rainfall.
5. The incidence of blackarm in the neglected plots was much higher than anywhere else on the farm, 8% of the plants being infected. Although the incidence of blackarm generally is not high, and loss of crop due to this disease is small compared with losses due to pests, its incidence will be watched carefully.

In the coming season this type of trial will be repeated with a simpler layout, mainly as a demonstration.

Plant Breeding.

Selection and Testing.

Owing to the intense jassid attack, jassid resistance has become a major character in the selection programme. It has provided a distinct problem; combined with the results from variety trials on Ilonga and district plots, the selection material available can now be more clearly assessed.

The selections have been grouped into:—

(a) Strains selected before 1951.

(b) Strains selected in 1951.

(c) Strains selected from 1951 material in 1953.

(d) A wide range of types selected in 1954 and 1955 from all previously selected lots and Eastern Province Local.

Strains Selected Before 1951.—Twelve of the strains were kept from the previous season and tested in trials at Ilonga and district plots. None are pure lines and none of them has good jassid resistance. Some are extremely variable and will be useful as parent strains. Several were good in all other required characters, lint quality, yield, ginning percentage and seed coat damage count. None will be carried on in variety trials next year.

1951 Selections.—Thirty-four strains and 2 controls were included in a variety trial 6 × 6 balanced lattice. Of these, three strains combined jassid resistance with all the other good characters and have been included in district plot trials for next year. Sixteen strains gave significantly higher yields than Local.

1953 Selections.—Twenty-three strains with 2 controls were tested in a variety trial, 5 × 5 balanced lattice. Eight strains have all the good characters and four of these were very good in all respects. These four will be planted in district trials next season (see Table 4). This table, although the number of strains shown is small, indicates the type of progeny being obtained.

1954 Selections.—Small bulk plots were planted of 440 selections made in 1954. 80 strains have been kept for testing in variety trials next season. Selection was based mainly on jassid resistance and habit. A small compact type of plant will be the most suitable for insecticide treatment and general cultivation in this area. Previous selection of these strains, last year, was based mainly on seed characters.

TABLE 4.

CHARACTERS OF THE PARENTS AND THE TYPE OF PROGENY BEING SELECTED FROM THEM.

	Lb. lint acre	*G.O.T.*	*Percentage seed coat damage*	*Adjusted count strength product from S.S.S. Tests.*	*Jassid*
Parent 51/58	530	30·6	7	—	4
Progeny 53/63	481	31·4	5	2075	3
64	532	30·4	1	2229	3
Parent 51/61	532	30·4	6	2043	2
Progeny 53/68	553	30·2	5	2048	3
Parent 51/77	575	29·0	7	2229	2
Progeny 53/122	675	30·0	5	2402	2
128	658	30·8	6	2176	2
125	582	29·3	1	—	2
Parent 51/113	551	29·6	12	1990	3
Progeny 53/192	596	31·8	6	2029	2
193	636	29·2	8	2042	1
53 trial					
Controls 47/10	452	28·4	7	2129	3
Local	436	29·1	5	2056	2
S.E.	12				
Sign. Diff. (P ·05)	85				
51 trial					
47/10	421	28·2	8	—	4
Local	376	30·4	6	—	3
S.E.	12				
Sign. Diff. (P ·05)	86				

Grading.

Jassid resistant 1. Jassid susceptible 5.

1955 Selections.—900 single plant selections were made on jassid resistance and habit in the field and then tested for seed characters in the laboratory. 283 will be grown next year in small plots.

Panmixis.—All strains selected up to 1951 were mixed together and will be grown for several seasons to form a nucleus for eventual filtering. All jassid susceptible types and other plants with bad field characters will be rogued out annually.

Rufiji Types.—The position regarding finer lint types for the potential irrigation scheme in the Rufiji valley is confused, as the selected strains from local cottons need to be grown under the environmental conditions of the Rufiji valley. Therefore a wide range of types has been kept. Seed has been obtained from the Rufiji ginnery and will be grown at Ilonga next year. Further selections will be obtained from this.

Nineteen strains from the Sudan, Uganda and Ukiriguru were also grown as bulks in readiness for testing in the Rufiji. No comment can be made on any of this material until it can be grown under irrigation there. A considerable amount of seed cotton was obtained from all the strains planted.

Summary.—Generally, there is a lot of variation in the crop in all the required characters, as shown by the progeny obtained from the earliest selected strains and Local. This applies to both field characters and seed characters. Selections along the same lines will be continued next season and possible strains for distribution throughout the Province will be tested in district plots.

Numerous seed lots are available for testing in the Rufiji valley when the pilot irrigation scheme starts.

District Plots.

Although the accuracy of the yield figures was not high, considerable useful information has been obtained. The main objects of the trials this year were to give a good testing to all the oldest strains throughout the Province to see to what extent variable conditions affected cotton in the various districts and to gain experience in the ability of recorders, relatively inexperienced in some cases, to dust cotton when no European supervision was available.

The strains all proved jassid susceptible and will be discarded. Variations in environmental effects are shown in Table 5. There is sufficient variation to make district plots well worth while and when a strain is available for distribution throughout the Province information will also be available on its performance in each of the different cotton areas in the Province.

Dusting was ably managed by the recorders, but in several areas the cotton dust arrived late in the season due to bad roads and heavy rainfall; consequently loss to pests was heavy.

Next season, the number of district plots will be reduced to four, Msoga, Mkundi, Kissaki and Mwaya. Besides a variety trial, a time of planting trial is being planted at Mkundi and Kissaki with dusted and not dusted plots to obtain a comparison of bollworm control elsewhere than Ilonga. The reduction in the number of plots should improve their efficiency, better trained recorders being available to supervise them.

The biggest differences shown in Table 5 are those between ginning percentages, lint lengths and uniformity at Ilonga, compared with the other districts. This indicates that growing conditions at Ilonga are better than in most other areas in the Province.

Spinning Test Reports.

Fourteen strains grown in variety trials at Ilonga were tested by the Shirley Institute against Local and 47/10. Local was shown to be the coarsest cotton, 47/10 was one of the longest, and 53/122 gave yarn outstanding in strength. Strength differences between the rest were not great. Yarn appearance was good for all strains. 53/122 also has good field characters and seed characters; it was the highest yielder in the 1953 types strain trial.

Table 5.

Mean values for all 16 strains.

		Seed Characters—District Plots.			
Place.	*G.O.T.*	*Combined lint length in mm.*	*Range of lint length in mm.*	*Wt. 100 seeds in grms.*	*Seed coat Damage %*
Ilonga	29·3	35·6	4	9·4	8
Mvomero	32·0	32·5	6	9·0	6
Mkundi	31·6	33·8	5	9·4	6
Dakawa	33·3	33·7	5	9·0	10
Kissaki	32·8	32·8	6	9·5	7
Mione	31·6	33·0	5	8·7	12
Msoga	30·9	33·0	6	9·3	11
Malinyi	33·9	32·9	5	8·2	8
Mwaya	30·2	34·1	5	9·5	7

Seed Coat Damage.

Counts were made on all strains and new selections. The percentage seed coat damage was below 20% in almost every case. Table 5 shows the variation between districts; the percentage seed coat damage was lower and more consistent from place to place than in the previous year, a much drier season.

Entomology.

BY

E. W. VALENTINE.

Most of the Entomologist's staff were engaged in a large scale field trial of insect pest control in local African grown cotton, so that it was not possible to repeat the usual continuous recording of pest populations. The notes on insect pests are therefore only general.

American Bollworm (*Heliothis armigera*).

Field Sampling.—Before the cotton season, American bollworm was recorded in chick pea (*Cicer arietinum*) in November and on riverside maize in December, then through January to late February on November-planted maize. There was a slight break before further records were made on maize in late March on January and February plantings.

American bollworm entered the cotton crop relatively early, some larvae being found in mid March; damage had reached a sufficiently high level in some areas in April for control measures to start. The highest populations were recorded through May and June, when there was also a heavy infestation in sunflower; after this the level of attack fell sharply. The last record was in mid July.

It is expected that American bollworm will decrease in cotton at this time, and this was probably accentuated this season by the transfer to chick pea. This is a plant which will attract American bollworm at all stages of development, from soon after germination until the plants are almost completely dried. Young larvae feed on the surface of the leaf, and the more mature larvae on the seed pods. Spot counts showed that populations reached levels of 15-25,000 larvae per acre, the higher number in denser growth, i.e. close spacing and heavy seed rate. Under these conditions parasitism by tachinids was very high, and also infection by the fungus *Spicaria rileyi* (Mabul), recorded for the first time this year. In each of several collections of several hundred larvae up to 40% had been killed by fungus. Of other larvae not showing obvious signs of infection, kept in the laboratory, 25-45% died from this fungus and from 6 to 30% from parasitism, with total mortalities from 70 to 96%. Infected larvae were also found on cotton and sorghum, but at a much lower level. Other lepidopterous larvae, principally *Prodenia litura* F., on chick pea and castor were attacked by the fungus.

Egg-laying by American bollworm was extensive on dwarf pigeon pea (*Cajanus indicus*) during July, but on this crop also, parasitism, mainly by *Charops sp.,* and predation by Hemiptera, were very high.

Both the chick pea and pigeon pea were sprayed in August so that the course of the infestation could not be recorded.

Pupation Periods.—Some records were taken, but due to pressure of other work this could not be done on the same scale as in previous years. High mortalities in cultures also reduced the amount of information available. Of the small number of pupation periods measured (185) only 7 exceeded 20 days, one of which extended to 40 days (from mid July).

Spiny Bollworm.

This pest was particularly serious throughout the whole season both on the station and in the district. It is probable that it first built up on annual *Hibiscus* and *Abutilon* spp. and entered the cotton crop in April and May. In June the infestation exceeded that of American bollworm.

Pink Bollworm.

No pink bollworm was present in the early planted crop as in the previous year, but a few specimens were found in African cotton at the end of July and then later in September and October in the top crop. By this time all the station cotton had been uprooted and burnt.

Stainers.

As most of the crop was opening during July when the influx of stainers began, little damage was done by staining. Some of the later African crops, especially those near kapok and baobab trees, were infested by *D. fasciatus,* resulting in staining of young bolls.

Aphids.

At no time were aphids a serious problem. The level of infestation was low during the whole season, owing probably to the continuous rain and high humidity. These conditions seemed to favour the development of a fungus which checked any build-up. In some insecticide trials it was found unnecessary to include aphicides.

Jassid.

Undoubtedly this was the most serious pest of cotton this season Climatic conditions were favourable for a heavy infestation, which was general throughout the Province. Considerable damage was done to Local cotton, which is highly susceptible.

Prodenia.

This pest is another which caused greater damage in young cotton than in previous years, at least in the environs of Kilosa.

Field Dusting Trial.

Layout.—Two $\frac{1}{4}$ acre plots in each of 87 African gardens. Two $\frac{1}{8}$ acre plots in each of 13 African gardens. One plot in each garden dusted and one left as a control.

These were chosen in groups of ten near the Research Station, for convenience of operation only.

Treatment.—8 lb. of a mixture of 10% DDT and 3% BHC per acre per application for a period of 8 weeks in the $\frac{1}{4}$ acre plots, and 16 lb. in the $\frac{1}{8}$ acre plots.

Duster.—Swaine hand blower, the work being done by the farmers themselves.

The results of this trial was rather disappointing compared with our success on the Station, but they did provide a great deal of useful information on standards of cultivation and the effects of these on the efficiency of pest control measures.

General Notes on Cultivation.

All but five of the gardens were interplanted with maize, which is general practice in this particular area, but not typical of the district as a whole. (Thus this testing was on cotton growing well below standard.) Usually maize is the first crop planted, cotton being planted later at 3 ft. spacings in alternate rows. This season, the two crops were planted within a few days of each other. 93 gardens were planted in the first two weeks of February, 6 in the second two weeks, and one at the end of March. The areas of cotton planted varied from $\frac{1}{2}$ acre to 20 acres, depending mainly on the area planted to maize. 65 were less than 2 acres, 26 between 2 and 4 acres, and the remaining 9 between 5 and 20 acres, with an average size of $2\frac{3}{4}$ acres.

Very few crops were well cultivated, and in fact the poor cultivation, interplanting, late thinning, and weediness throughout the whole season were mainly responsible for the low yields. Worthwhile results from treatments could not be expected under such conditions. Early infestation by jassid and *Prodenia* also cut down the potential yield, and later the heavy spiny bollworm attack was difficult to control with dusts.

Insecticide applications were commenced at various dates during the period late April to mid May, when the damage count reached the equivalent of 5,000 flared squares (damaged buds) per acre. This count was proportionately high, as at that stage plants were carrying few buds, owing to shading by maize and smothering by weeds.

The summary gives averages for 81 plots, the others being excluded due to lack of co-operation from growers, abandonment of gardens, and inability to fit in two full size plots. Thirteen $\frac{1}{8}$ acre plots were given double the standard application of insecticide.

TABLE 6.

SUMMARY OF YIELDS FROM 81 PLOTS OF THE FIELD TRIAL, 1955, IN LB. SEED COTTON PER ACRE. NET INCREASE. (INCREASE MINUS 110 LB. OF SEED COTTON TO COVER THE COST OF INSECTICIDE (64/-).)

Treated yields—lb. seed cotton per acre from	*No. of plots.*	*Average yields.*		*Incr.*	*Net. Incr.*
		Dusted.	*Undusted*		
40-100	5	78	32	46	–64
101-200	30	159	43	116	6
201-300	28	243	55	188	78
301-400	9	349	62	287	177
401-500	6	457	95	362	252
501-600	3	567	248	319	209
Average of	81	245	60	185	75

TABLE 7.

AVERAGE YIELD IN LB. SEED COTTON PER ACRE FROM THIRTEEN $\frac{1}{8}$ ACRE PLOTS TREATED WITH 16 LB. OF MIXTURE OF 10% DDT+3% BHC PER ACRE APPLICATION FOR 8 WEEKS. 220 LB. SEED COTTON DEDUCTED TO COVER COST OF INSECTICIDE (128/-).

Dusted.	*Undusted.*	*Increase.*	*Net Increase.*
268	45	223	3

It will be noted from Table 6 that, although the average yield was considerably increased, a substantial net increase was not achieved until the yields from the dusted plots exceeded 200 lb. seed cotton per acre—really a very miserable yield. This helps to demonstrate the fact that unless the potential yield of the crop is relatively high, dusting is hardly economical. The higher rate of application for the conditions of cotton growing described was again shown to be uneconomical.

Future extension of this work will be concentrated on those growers who take a reasonable interest in cotton growing and are prepared to cultivate to a sufficiently high standard to be assured of a profit from insect pest control.

Survey of Insecticidal Work.

The insecticidal work on cotton at Ilonga was divided between the C.A.I.R.U. entomologist, the E.C.G.C. entomologist and the E.C.G.C. plant breeder.

1. On Ilonga various formulations and dosages were tested on cotton planted at different times. Also methods of application were investigated by the C.A.I.R.U. This work is reported in the East African Agricultural Journal.

2. Attempts at dusting native garden near Ilonga to obtain information on methods of extending results into the commercial crop were carried on by the E.C.G.C. entomologist. He also made observations on the cycle of various insect attacks during the season.

3. Methods of cultivation were tested by the plant breeder both on Ilonga and at district plots. His staff also demonstrated that relatively large areas of cotton can be dusted effectively without specialised entomological or insecticidal knowledge both on Ilonga and in district plots throughout the Province.

On well grown cotton, dusting gives adequate control and a considerable economic return for the outlay. With the Swaine duster it is convenient and simple for the small grower to apply his dust. Sprays may give complete control, but water is needed and this is scarce in considerable areas and usually requires transporting.

As insecticidal applications are a matter for the individual, dusting is probably better than spraying for widespread use in the Eastern Province, in view of the conditions, the low educational standards and the facilities and staff available.

Appendix.

Summary of Strains.

Eastern Province Local	The commercial cotton in the Province, mainly of Uganda Local origin.
47/10	A selection from 'Local', now replacing Local in the Province.
53/122	Ex 51/77, a very good yielder, with good lint and jassid resistance, but low ginning percentage. Originally selected from Local.
Pre 51 strains	All strains selected previous to 1951 from Eastern Province Local.
51 strains	Strains selected in 1951 from pre 51 strains.
53 strains	Strains selected in 1953 from 51 strains.
54 strains	Strains selected from pre 51 strains, 51 strains and Eastern Province Local.
55 strains	Strains selected from pre 51 strains, 51 strains, 53 strains and Eastern Province Local.

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T. BUNCLE AND CO. LTD., ARBROATH.